REMARKS

This paper is being provided in response to the Final Office Action dated January 8, 2007 for the above-referenced application. In this response, Applicant has added new Claims 108-112, canceled Claims 4, 42, 54, 55, 60, 98, 106 and 107, and amended Claims 1, 9, 35, 38-41, 43, 44, 47-49, 52, 56, 57, 65, 91, 94-97, 99, 100, 103 and 104 in order to clarify that which Applicant deems to be the claimed invention. Applicant respectfully submits that the newly added claim and the amendments to the claims do not add new matter and that the foregoing amendments to the claims are supported by the originally filed application.

The rejection of Claims 1-107 under 35 USC 101 as relating to non-statutory subject matter is hereby traversed and reconsideration thereof is respectfully requested. Applicant respectfully submits that the rejection as applied to Claims 4, 42, 54, 55, 60, 98, 106 and 107 canceled herein is now moot.

Page 2 of the Office Action indicates that Claims 1-37, 52-53, 57, 60-93, 104 and 105 include neural networks that are not trained and non-functional. Page 2 of the Office Action also states that Claims 58-59 including training offline but that there is no indication of the relevance of the training. Applicant respectfully submits that independent Claims 1, 52, 57, and 104 have been amended to state that the neural networks are trained to determine the weight of the aircraft for at least one flight regime based on the relationship between the weight and one or more neural net inputs. As such, the remarks set forth in the Office Action regarding the offline training of Claims 58 and 59 also have been addressed.

Page 3 of the Office Action states that unless functional related values are input to the Kalman filter and the Kalman filter is appropriately derived, determination of weight cannot be made and the invention has no utility. Page 3 states that Claims 38-51, 54-56, 94, 95, 103, 106 and 107 identify use of the Kalman filter algorithm but without proper condition of such algorithm the claim is functionless or has no utility. Page 3 also states that Claims 38-51, 54, 55, 94-103, 106 and 107 invite the use of data that is not relevant to the subject invention which renders the claims ineffective or lacking utility. Applicant has amended independent Claims 38, 48, 56 and 94 to recite that the Kalman filter uses functional related inputs. For example, Claim 38 as amended herein recites that a state as determined by the Kalman filter corresponds to state parameters including the weight of the aircraft at a point in time and fuel flow rate at the point in time.

Page 3 of the Office Action states that Claims 35 and 91 are rejected under 35 USC 101 as lacking patentable utility. Applicant has amended Claims 35 and 91 herein in accordance with remarks set forth in the Office Action to state that tanh is not equal to zero.

In view of the foregoing amendments and remarks, Applicant respectfully requests that that rejection be reconsidered and withdrawn.

The rejection of Claims 1-107 under 35 U.S.C. § 112, ¶1 is hereby traversed and reconsideration thereof is respectfully requested. The Office Action states that this rejection is made due to a previously cited rejection of Claims 1-107 under 35 U.S.C. 101. This rejection as applied to Claims 4, 42, 54, 55, 60, 98, 106 and 107 canceled herein is now moot. Applicant respectfully submits that the rejection of Claims 1-107 under 35 USC 112, first paragraph, based

on the previous 101 rejection, has been addressed by the amendments and remarks made herein as set forth above in connection with the previous 101 rejections.

In view of the foregoing, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

The rejection of Claims 1-15, 17-37, 48-93, 104 and 107 under 35 U.S.C. 102(b) as being anticipated by McCool et al. (U.S. Patent No. 5,987,397, hereinafter referred to as "McCool") is hereby traversed and reconsideration thereof is respectfully requested. Applicant notes that the Office Action at page 4 appears to state in error that this rejection applies to Claims 54-55 and 107. This rejection as applied to Claims 4 and 60 is moot in view of the cancellation of these claims herein.

Claim 1, as amended herein, recites a method for determining a weight of an aircraft comprising: determining a flight regime corresponding to a current flight state of the aircraft in accordance with one or more inputs characterizing said current flight state of the aircraft; selecting a neural net in accordance with said flight regime, wherein said neural net is selected from a plurality of neural nets, each of said plurality of neural nets being trained to determine said weight of said aircraft for at least one flight regime based on a relationship between said weight and one or more neural net inputs, and wherein said neural net selected is trained to determine said weight of said aircraft in said flight regime; and determining said weight using said neural net. Claims 2-3, 5-15, and 17-37 depend from Claim 1.

Claim 48, as amended herein, recites a system for determining a weight of an aircraft comprising: a regime recognizer that determines a regime indicator in accordance with a portion of said one or more inputs, said regime indicator indicating a flight regime associated with a current flight state of the aircraft based on said portion of the one or more inputs; and a gross weight estimator that determines said weight of said aircraft, said gross weight estimator including at least one of: a Kalman filter, and one or more neural nets, and using at least one of said Kalman filter and a first of said one or more neural nets in determining said weight, each of said one or more neural nets being trained to determine said weight of the aircraft for at least one flight regime based on a relationship between said weight and one or more neural net inputs, a state as determined by said Kalman filter at a point in time corresponding to state parameters including the weight of the aircraft and fuel flow rate at said point in time. Claims 49-51 depend from Claim 48.

Claim 52, as amended herein, recites a method for determining an aircraft parameter comprising: determining a flight regime corresponding to a current flight state of an aircraft in accordance with one or more inputs characterizing said current flight state of the aircraft; selecting a neural net in accordance with said flight regime, wherein said neural net is selected from a plurality of neural nets, each of said plurality of neural nets being trained to determine said aircraft parameter when the aircraft is in at least one flight regime based on a relationship between said aircraft parameter and one or more neural net inputs, and wherein said neural net selected is trained to determine said aircraft parameter when the aircraft is in said flight regime; and determining said aircraft parameter using said neural net. Claim 53 depends from Claim 52.

Claim 56, as amended herein, recites a system for determining an aircraft parameter comprising: a regime recognizer that determines a regime indicator in accordance with a portion of said one or more inputs, said regime indicator representing a flight regime of an aircraft being associated with a current flight state of the aircraft based on said portion of the one of more inputs; and an aircraft parameter generator that determines said aircraft parameter, said aircraft parameter generator including at least one of: a Kalman filter, and one or more neural nets, and using at least one of said Kalman filter and a first of said one or more neural nets in determining said aircraft parameter, each of said one or more neural nets being trained to determine said aircraft parameter when said aircraft is in at least one flight regime based on a relationship between said aircraft parameter and one or more neural net inputs, a state as determined by said Kalman filter including said aircraft parameter at a point in time.

Claim 57, as amended herein, recites a computer readable medium comprising code stored thereon for determining a weight of an aircraft, the computer readable medium comprising code that: determines a flight regime corresponding to a current flight state of the aircraft in accordance with one or more inputs characterizing said current flight state of the aircraft; selects a neural net in accordance with said flight regime, wherein said neural net is selected from a plurality of neural nets, each of said plurality of neural nets being trained to determine said weight of said aircraft for at least one flight regime based on a relationship between said weight and one or more neural net inputs, and wherein said neural net selected is trained to determine said weight of said aircraft in said flight regime; and determines said weight using said neural net. Claims 58, 59, and 61-93 depend from Claim 57.

Claim 104, as amended herein, recites a computer readable medium comprising code stored thereon for determining an aircraft parameter, the computer readable medium comprising code that: determines a flight regime corresponding to a current flight state of an aircraft in accordance with one or more inputs characterizing said current flight state of the aircraft; selects a neural net in accordance with said flight regime, wherein said neural net is selected from a plurality of neural nets, each of said plurality of neural nets being trained to determine said aircraft parameter when the aircraft is in at least one flight regime based on a relationship between said aircraft parameter and one or more neural net inputs, and wherein said neural net selected is trained to determine said aircraft parameter when the aircraft is in said flight regime; and determines said aircraft parameter using said neural net.

McCool discloses use of a neural network for estimating the helicopter gross weight and center of gravity location. (See title, abstract generally). McCool discloses that information on gross weight and center of gravity location in a helicopter is estimated in a real time fashion by a neural network system which includes means for defining input signals derived from a plurality of variable parameters that are recorded during flight of the helicopter based on measurements in a non-rotating reference frame associated with the helicopter. Previously recorded test flight data in terms of variable input parameters and coinciding reference data on gross weight and center of gravity location are used to establish a learned relationship between such input parameters and the coinciding reference data. Memory means is provided for storing the learned relationship as a nonlinear algorithm on board the helicopter for use in a signal processor, receiving real time values of the input parameters and in accordance with said algorithm determine and display estimates of the gross weight and center of gravity locations under flight conditions. (Col. 1, Lines 35-52).

Claim 1, as amended herein, is neither disclosed nor suggested by McCool in that McCool neither discloses nor suggests ***a method for determining a weight of an aircraft comprising: determining a flight regime corresponding to a current flight state of the aircraft in accordance with one or more inputs characterizing said current flight state of the aircraft; selecting a neural net in accordance with said flight regime, wherein said neural net is selected from a plurality of neural nets, each of said plurality of neural nets being trained to determine said weight of said aircraft for at least one flight regime based on a relationship between said weight and one or more neural net inputs, and wherein said neural net selected is trained to determine said weight of said aircraft in said flight regime,*** ... as set forth in Claim 1.

As support for each of the foregoing recited steps of Claim 1, the Office Action at pages 4-5 relies on Col. 1, Lines 35-52 of McCool. This citation of McCool is pointed out above. Applicant respectfully submits that this citation of McCool appears silent regarding the determining step as recited in amended Claim 1. Furthermore, this citation of McCool is also silent with respect to the selecting step as set forth in amended Claim 1.

McCool discloses operating his system 10 during a first hover maneuver or hover flight conditions and making an initial estimate regarding the gross weight and center of gravity. (See, for example, Col. 2, Lines 53-66; step 40 of Figure 2; Col. 3, Lines 30-33). The initial calculations regarding gross weight and center of gravity are updated using the fuel information to determine the desired real-time gross weight and center of gravity location output. (See Figure 4, step 44, Col. 3, Lines 35-37). Applicant notes that McCool does not disclose how a

determination is made as to when the helicopter is in a first hover maneuver, hover flight condition, or any other current flight state. Furthermore, McCool makes no disclosure or suggestion of determining a flight regime corresponding to a current flight state of the aircraft. Thus, McCool neither discloses nor suggests Applicant's determining step of amended Claim 1.

Applicant submits that McCool also makes no disclosure or suggestion of Applicant's selecting step. McCool teaches a methodology in which the neural net is only trained in hover flight conditions. Accordingly, McCool cannot possibly teach or disclose selecting a neural net which is trained to determine the weight of the aircraft in the flight regime corresponding to the current flight state of the aircraft and which is selected from a plurality of neural nets each trained to determine the weight of the aircraft for at least one flight regime in accordance with a flight regime when McCool's neural net is only operative under hover flight conditions. Furthermore, as set forth in the processing step of Figure 2, there is no selection step for selecting a neural network in accordance with a flight regime corresponding to the current flight state of the aircraft. Therefore, McCool neither discloses nor suggests Applicant's selecting step as recited in amended Claim 1.

For at least these reasons, Applicant's Claim 1, and claims that depend therefrom, are neither disclosed nor suggested by McCool.

Applicant's Claims 52, 57, and 104 recite features similar to those set forth in Claim 1. Thus, Claims 52, 57, and 104, and claims that depend therefrom, are also neither disclosed nor suggested by McCool for reasons similar to those set forth regarding Claim 1.

Applicant's Claim 48 is neither disclosed nor suggested by McCool in that McCool neither discloses nor suggests at least the features of ***a system for determining a weight of an aircraft comprising: a regime recognizer that determines a regime indicator in accordance with a portion of said one or more inputs, said regime indicator indicating a flight regime associated with a current flight state of the aircraft based on said portion of the one or more inputs,*** ... as set forth in Claim 48. The Office Action at page 11 cites to McCool at Col. 2, Lines 32-67 for disclosing the foregoing features of Claim 48. As set forth above, McCool's processing takes place when the helicopter is hovering. However, McCool is silent regarding how a determination is made regarding when the helicopter is hovering. McCool does not disclose or fairly suggest using a neural net in connection with any other regime other than hovering and neither discloses nor suggests any means to determine a flight regime associated with a current flight state of the aircraft. McCool only discloses a helicopter hovering and makes no disclosure or suggestion of determining a flight regime associated with a current flight state of the aircraft.

For at least the foregoing reasons, Applicant's Claim 48, and claims that depend therefrom, are neither disclosed nor suggested by McCool.

Claim 56 recites features similar to those set forth above in Claim 48. Thus, Claim 56 is neither disclosed nor suggested by McCool for reasons similar to those set forth regarding Claim 48.

In view of the foregoing, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

The rejection of Claims 38-47, 54-55, 94-103 and 106 under 35 U.S.C. 102(b) as being anticipated by Smith et al. (U.S. Patent No. 5,606,505, hereinafter referred to as "Smith") is hereby traversed and reconsideration thereof is respectfully requested. Applicant respectfully submits that this rejection as applied to Claims 42, 54, 55, 98, 106 and 107 is moot in view of the cancellation of these claims herein.

Claim 38, as amended herein, recites a method of determining a weight of an aircraft comprising: receiving one or more values related to the aircraft and used in determining the weight of the aircraft; and determining said weight at a point in time using a Kalman filter wherein said one or more values are used as inputs to said Kalman filter and said Kalman filter produces the weight as an output, a state as determined by said Kalman filter corresponding to state parameters including a weight of the aircraft at said point in time and fuel flow rate at said point in time, a measurement vector for said Kalman filter including a weight of the aircraft, a fuel flow rate, and a second weight of the aircraft determined in accordance with a flight regime of the aircraft characterizing a flight state of the aircraft, a covariance matrix used by said Kalman filter including an element associated with said second weight wherein a value of said element varies in accordance with whether said aircraft is determined to be in said flight regime when said determining step is performed. Claims 39-41, and 43-47 depend from Claim 38.

Claim 94, as amended herein, recites a computer readable medium comprising code stored thereon that determines a weight of an aircraft, the computer readable medium comprising code that: receives one or more values related to the aircraft and used in determining the weight of the aircraft; and determines said weight at a point in time using a Kalman filter wherein said

one or more values are used as inputs to said Kalman filter and said Kalman filter produces the weight as an output, a state as determined by said Kalman filter corresponding to state parameters including a weight of the aircraft at said point in time and fuel flow rate at said point in time, a measurement vector for said Kalman filter including a weight of the aircraft, a fuel flow rate, and a second weight of the aircraft determined in accordance with a flight regime of the aircraft characterizing a flight state of the aircraft, a covariance matrix used by said Kalman filter including an element associated with said second weight wherein a value of said element varies in accordance with whether said aircraft is determined to be in said flight regime when said determines is performed. Claims 95-97, and 99-103 depend from Claim 94.

Smith relates to flight management systems. In particular, Smith pertains to estimating and predicting aircraft performance. (Col. 1, Lines 9-12). Smith discloses a system including a learning portion 12 and a predicting portion 14. The portion 12 includes signal conditioning 15 and performance estimation 16. The learning portion 12 includes modeling a thrust minus drag relationship of an aircraft utilizing signal input parameters 26, such as current aircraft weight and altitude, and aircraft specific data. Signal conditioning includes as an output 28 a gross weight estimate (Figure 1, Col. 3, Lines 33-40; Col. 8, Lines 22-28). Figure 2 details signal conditioning 15 and includes generating the gross weight estimate as an output of integrator 34. Figure 2 also includes an altitude rate filter 40 and acceleration rate filter 42 disclosed as being Kalman filters. (Figure 2; Col. 7, Lines 11-16). Figure 3 includes 2 Kalman filters to learn the coefficients of the Taylor series expansion modeling thrust minus drag and rated fuel flow. Figure 3 includes performance Kalman filter 48 and fuel flow rating Kalman filter 52.

Claim 38, as amended herein, is neither disclosed nor suggested by Smith in that Smith neither discloses nor suggests at least the features of ***a method of determining a weight of an aircraft comprising: ... determining said weight at a point in time using a Kalman filter wherein said one or more values are used as inputs to said Kalman filter and said Kalman filter produces the weight as an output, a state as determined by said Kalman filter corresponding to state parameters including a weight of the aircraft at said point in time and fuel flow rate at said point in time, a measurement vector for said Kalman filter including a weight of the aircraft, a fuel flow rate, and a second weight of the aircraft determined in accordance with a flight regime of the aircraft characterizing a flight state of the aircraft, a covariance matrix used by said Kalman filter including an element associated with said second weight wherein a value of said element varies in accordance with whether said aircraft is determined to be in said flight regime when said determining step is performed,*** as set forth in Claim 38. As pointed out above, Smith discloses use of Kalman filters in connection with his Figures 2 and 3. Smith discloses use of Kalman filters in connection with element numbers 40 and 42 of Figure 2, and element numbers 48 and 52 of Figure 3. However, Smith appears to neither disclose nor suggest a Kalman filter using state parameters as set forth in Claim 38 and neither discloses nor suggests use of the second weight determined in accordance with a flight regime and an element in the covariance matrix associated with the second weight having a value that varies in accordance with whether the aircraft is determined to be in the flight regime as set forth in Claim 38. Accordingly, Smith does not disclose or suggest the foregoing recited features of Claim 38.

For at least the foregoing reasons, Claim 38, and claims that depend therefrom, are neither disclosed nor suggested by Smith.

Claim 94 recites features similar to those set forth in connection with Claim 38. Thus, Claim 94, and claims that depend therefrom, are neither disclosed nor suggested by Smith for reasons similar to those set forth regarding Claim 38.

In view of the foregoing, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

Applicant respectfully submits that newly added Claims 108-112 are also patentable over the cited art.

Based on the above, Applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8604.

Respectfully submitted,
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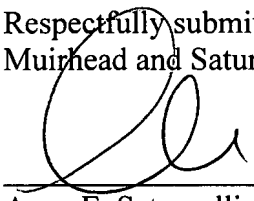

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